



## PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT  
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P56965PC00	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/NL 02/00221	International filing date ( <i>day/month/year</i> ) 05.04.2002	Priority date ( <i>day/month/year</i> ) 05.04.2002
International Patent Classification (IPC) or both national classification and IPC H03B5/12		
Applicant TELEFONAKTIEBOLAGET L.M. ERICSSON (publ.) et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.  
  
☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).  
  
 These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:
  - I ☒ Basis of the opinion
  - II ☐ Priority
  - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
  - IV ☐ Lack of unity of invention
  - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
  - VI ☐ Certain documents cited
  - VII ☐ Certain defects in the international application
  - VIII ☐ Certain observations on the international application

Date of submission of the demand  09.10.2003	Date of completion of this report  15.07.2004
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer  Robinson, V  Telephone No. +49 89 2399-7572 

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. **PCT/NL 02/00221**

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-14 as originally filed

**Claims, Numbers**

1-16 received on 03.05.2004 with letter of 29.04.2004

**Drawings, Sheets**

1/4-4/4 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	1-15
	No: Claims	16
Inventive step (IS)	Yes: Claims	1-15
	No: Claims	16
Industrial applicability (IA)	Yes: Claims	1-16
	No: Claims	

2. Citations and explanations

**see separate sheet**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/NL 02/00221

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement**

Reference is made to the following document:

D1: US-A-3 979 693 (SAARI VEIKKO REYNOLD) 7 September 1976

**1. Independent Claim 16:**

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 16 is not new in the sense of Article 33(2) PCT.

**1.1 Document D1 discloses:**

A method of operating an oscillator circuit including an oscillator device (16, 17, 26, 27, 28) and a bias source (18, 13, 21). The bias source has at least a first state in which a high level of energy is provided to the oscillator (the state where the gain of the oscillator is below 1) and a second state in which a lower level of energy is provided to the oscillator (any state in which the gain of the oscillator is 1). The bias source is switched from the first state to the second state when a first predetermined criterion is satisfied (if the gain of the oscillator becomes 1) and the bias source is switched back to the first state if a second predetermined criterion is satisfied (if the gain of the oscillator drops below 1). See in particular D1, column 5, line 62 to column 6, line 2.

This method of operation in D1 serves to maintain a pure sinewave signal by ensuring that the oscillator does not provide too much gain. In doing so the method implicitly reduces power consumption by keeping the bias voltage and the oscillator gain just enough to sustain oscillation. D1 therefore implicitly discloses a method suitable for reducing the power consumption of an oscillator.

Since D1 therefore discloses all of the features of independent claim 16, that claim is not novel.

**2. Independent Claim 1:**

2.1 The limiter device in the last feature of claim 1 is not clear because it has no precedent. The examiner has made the assumption in the following examination that the limiter is in fact the previously claimed signal shaper device.

2.2 Following from this assumption, the term "stops functioning properly" is not clear. The correct functioning of the signal shaper device/clipper/limiter as described in the description is to provide an output signal with an amplitude proportional to the oscillator signal as long as the oscillator signal has an amplitude below a boundary value, but to output a signal with a constant amplitude when the amplitude of the oscillator signal is above the boundary value (see description page 3, last paragraph). The term stops functioning properly in the claim however appear to contradict this definition and mean that the amplitude of the output of the limiter falls below the maximum value (see description page 12, lines 11-16). For the purposes of examination, the feature "an amplitude at which the limiter device stops functioning properly" has been interpreted as "at which the output of the signal shaper circuit would decrease below the predetermined amplitude".

2.3 Document D1, which is considered to represent the most relevant state of the art, discloses an oscillator circuit (see figure 1) comprising a bias source (13, 18) and a signal shaper circuit (12) from which the subject-matter of claim 1 differs in that the claimed bias source is switched between two levels, one of which is insufficient to maintain oscillation ("decreasing amplitude of the signal").

The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

The subject-matter of claim 1 is also considered to involve an inventive step because the bias source of D1 is controlled in a continuous manner. The skilled person would not choose the bias current levels in this circuit in such a way that the oscillation would not be sustained.

### **3. Dependent Claims 2-15**

Claims 2-15 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

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## Claims

1. An oscillator circuit (1), at least comprising at least one oscillator device (100)  
5 having at least one oscillator bias contact ( $V_{cm}$ ), a bias source ( $V$  bias) having a source contact connected to said oscillator bias contact, and a signal shaper device (101) connected to an output of the oscillator device (100), said signal shaper device being arranged for clipping the amplitude of the output signal of the oscillator device to a predetermined amplitude;
- 10 said bias source having a first state in which a high level of energy ( $V_1$ ) is provided at said source contact, and a second state in which a lower level of energy ( $V_2$ ) is provided at said source contact, wherein the high level of energy at said source contact will keep the oscillator device in an oscillating state, whereas the lower level of energy will result in a decreasing amplitude of the signal provided by the oscillator  
15 device (100) and wherein switching means ( $S$ ;  $M_{bias}$  2) are provided for switching the bias source from the first state to the second state and from the second state back to the first state before the decreasing amplitude of the signal provided by the oscillator device (100) decreases below an amplitude at which the limiter device stops functioning properly.
- 20
2. An oscillator circuit (1) as claimed in claim 1, wherein said bias source is a switched DC source which in use provides a bias signal varying between a first level and a second level.
- 25
3. An oscillator circuit (1) as claimed in claims 1 or 2, wherein the lower level of energy ( $N_2$ ) is substantially zero.
4. An oscillator circuit (1) as claimed in claim 3, wherein said signal shaper device comprises at least one limiter device (101).
- 30
5. An oscillator circuit (1) as claimed in claim 3, wherein said signal shaper device comprises a band-pass filter device.
6. An oscillator circuit (1) as claimed in any one of the preceding claims, further  
35 comprising:

a bias control circuit (Meas,Tr,S) for switching the bias source (Vbias) on and off depending on a signal outputted by the oscillator device (100).

7. An oscillator circuit (1) as claimed in any one of the preceding claims, wherein  
5 said oscillator device (100) at least comprises at least one electrical device with a positive feedback loop.

8. An oscillator circuit (1) as claimed in any one of the preceding claims, wherein  
10 said oscillator device (100) at least comprises at least one resonator body.

9. An oscillator circuit (1) as claimed in any one of the preceding claims, further  
comprising a negative resistance device (102) at least comprising at least one  
transistor device (Mresa,Mresb).

15 10. An oscillator circuit (1) as claimed in claim 4, wherein said limiter (101) at least comprises at least one differential amplifier (Mlima,Mlimb) with:  
at least one input contact connected to at least one oscillator output contact (inp), and  
at least one output contact (outp) connected to a load.

20 11. An oscillator circuit (1) as claimed in claim 10, wherein said load comprises:  
at least one resistor (Rlima) connecting at least one of said at least one output  
contacts (outp) to a power supply (Vcc).

25 12. An oscillator circuit (1) as claimed in any one of the claims 4-11, wherein said  
limiter (101) at least comprises at least one transistor device (Mlima, Mlimb).

13. An oscillator circuit as claimed in any one of the preceding claims, wherein  
said bias source comprises a bias voltage source.

30 14. An oscillator circuit as claimed in any one of the preceding claims, wherein  
said bias source comprises a bias current source.

15. A wireless electronic device including an oscillator circuit (1) as claimed in any  
one of claims 1-14.

16. A method for reducing the power consumption of an oscillator circuit including an oscillator device and a bias source, said method at least using a bias source having a first state in which a high level of energy is provided to the oscillator circuit and a
- 5 second state in which a lower level of energy or no energy is provided to the oscillator circuit, wherein the bias source is switched from the first state to the second state if a first predetermined criterion is satisfied and wherein the bias source is switched back to the first state if a predetermined second criterion is satisfied.